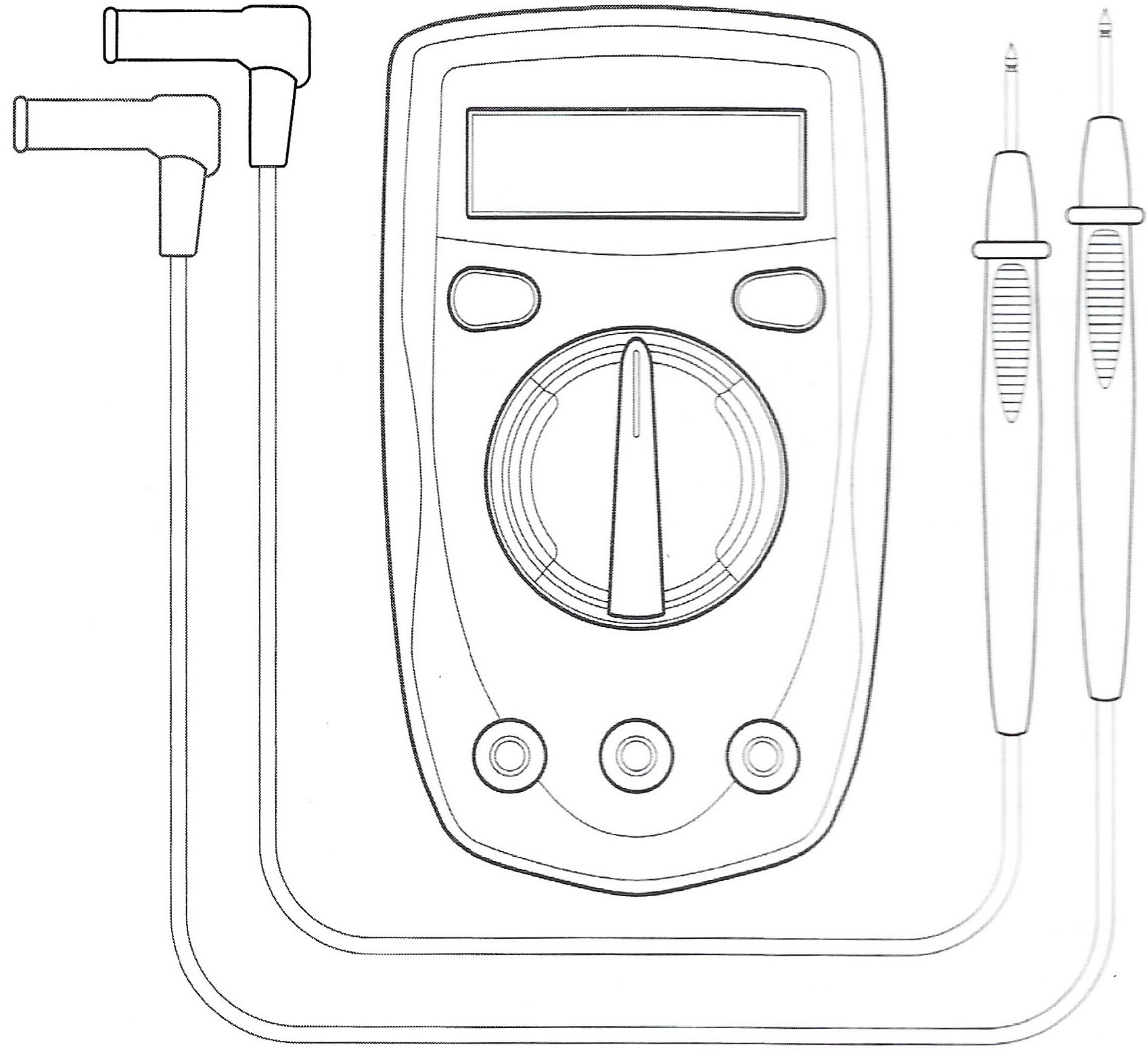
ETEKCITY®



Digital Multimeter

Model No.: MSR-R500

Questions or Concerns?

(855) 686-3835 • support@etekcity.com

Safe and Proper Usage

Thank you for purchasing the Etekcity® MSR-R500 Digital Multimeter. Measure DC and AC voltage, current, diode and audible continuity, and resistance with the convenience of one single tool with built-in overload protection.

WARNING: TO AVOID THE RISK OF ELECTRIC SHOCK OR THE DAMAGE OF THE MULTIMETER OR OTHER EQUIPMENT, DO NOT CONNECT TO ANY INPUT TERMINALS OF THE MULTIMETER THAT MAY EXCEED 500V.

Read all the instructions provided in this manual. Failure to comply with the instructions in the manual and/or use of the device in ways other than the ones mentioned in the manual may result in serious injury, fire, and/or electrical shock. The person responsible for this equipment must ensure that all users understand the directions and adhere to them.

This meter complies with standard IEC61010: in pollution degree 2, overvoltage category (CAT I 600V, CAT II 300V) and double insulation.

CAT I: Signal level, special equipment or parts of equipment, telecommunications, electronic, etc.

CAT II: Local level, appliance, PORTABLE EQUIPMENT etc., with smaller transient overvoltages than CAT III.

Safety Operating Procedures

- Be sure to read, understand and comply with all the instructions in this manual.
- Make sure the test leads are in a safe state. Keep

equipment out of humidity or moist environments.

- **DO NOT** use the meter if it is damaged or the case (or part of the case) is removed. Look for cracks or missing plastic. Check the insulation around the connectors before use.
- **DO NOT** use the equipment in wet environments.
- Remove the test probes from the item of measurement before changing the settings or measurement functions on the multimeter.
- **DO NOT** apply the multimeter to voltages that may exceed 500V.
- **DO NOT** measure voltages when the meter is set to measure resistance (Ω).
- Always use the fuses of the correct type as specified within the instructions to avoid any injury, electrical shock, or risk of fire.
- **DO NOT** operate the meter around explosive gas, vapor, or dust.
- When operating the test probes, keep your fingers behind the finger guards.
- When making electrical connections, connect the common test lead (black) before connecting the live test lead (red). When disconnecting, disconnect the live test lead (red) before disconnecting the common test lead (black).
- Always remove the test leads before replacing the battery within the multimeter or opening the battery compartment.
- Inspect the condition of the test leads and the multimeter for any damage before operating the meter. Repair or replace any damage before use.
- Verify the meter's operation by measuring a known voltage before and after using the meter.
- **DO NOT** change the settings on the rotary switch while the test leads are measuring a source of power.
- Use great care when making measurements if the

voltages are greater than 25VAC rms or 35VDC. These voltages are considered to be a shock hazard.

- **DO NOT** operate the meter with the battery cover removed or the case open.
- **DO NOT** remove the cover or open the case of the meter without first removing it from the main power source.
- **DO NOT** allow children to operate this device.
- USE a 9V DC battery when replacing the battery within the device.
- Make sure to insert the battery under the correct polarity indicated in the device.
- **DO NOT** use leaking batteries.
- **DO NOT** dispose old batteries in fire.
- Expired or damaged batteries can cause cauterization on contact with skin. Always therefore, use suitable hand gloves for protection in such cases.
- Disconnect circuit power and discharge all high voltage capacitors before testing resistance, continuity, diodes, or capacitance.
- Before measuring current, check the meter's fuses and turn off power to the circuit before connecting the meter to the circuit.
- In the case the device is going to be unused for an extended period of time, remove the battery before storage.

≂	AC or DC	🔋	Low Battery
~	AC Current	▶|	Diode
⎓	DC Current	▬	Fuse
⏚	Earth Ground	•)))	Continuity Test
⧈	Double Insulated	⚠	Warning

Meter Diagram

1. LCD Display
2. HOLD Button
3. Backlight Button
4. Rotary Switch
5. COM Terminal
6. 10A Terminal
7. Other Terminals

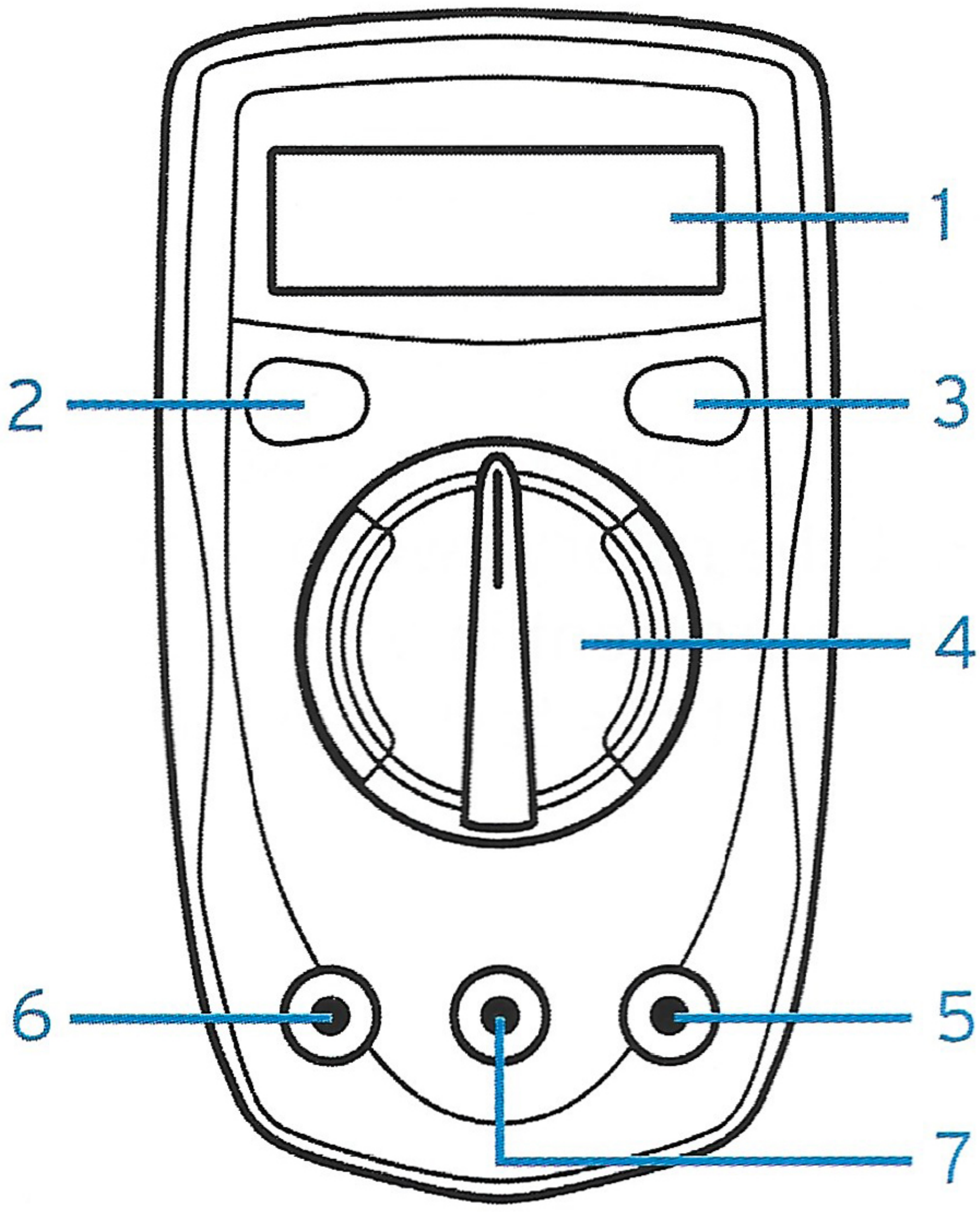


Figure 1

Button Functions

Button	**Operation**
HOLD	• Press once to lock measurement results (An 'H' symbol will appear on the display) • Press once more to unlock results
BACKLIGHT	• Press once to turn on the display backlight • Press once more to turn off backlight

General Specifications

Maximum Voltage (Including transient overvoltage) Between any Terminals & Grounding	500V rms
Fused Protection for VΩmA Input Terminal	500mA, 250V fast type, ϕ 5x20mm
10A Terminal	10A, 250V fast type, ϕ 5x20mm
Range	Manual Ranging
Maximum Display	1999
Measurement Speed	Updates 2 ~ 3 times/second
Temperature	Operating: 0°C ~ 40°C (32°F ~ 104°F) Storage: -10°C ~ 50°C (14°F ~ 122°F)
Relative Humidity	75% at 0°C ~ 30°C < 50% at 31°C ~ 40°C
Altitude	Operating: <2,000m Storage: <10,000m
Accuracy	(a% reading + b digits) Guaranteed for 1 year

Battery Type: 1 x 9V Battery NEDA 1604 / 6F22 / 006P
Overload Display: 1
Dimensions: 130 x 73.5 x 35mm
Weight: ~156g

DC Voltage

Range	Resolution	Accuracy	Overload Protection
200mV	100µV	± (0.5% +2)	250V DC or AC
2000mV	1mV		500V DC or AC
20V	10mV		
200V	100mV		
500V	1V	± (0.8% +2)	

Input impendance: 10M Ω

AC Voltage

Range	Resolution	Accuracy	Overload Protection
200V	100mV	± (1.2% +10)	500V DC or AC
500V	1V		

- Input impendance: approx. 5MΩ
- Displays effective value of sine wave (mean value response)
- Frequency response 40Hz ~ 400Hz

DC Current

Range	Resolution	Accuracy	Overload Protection
2000μA	1μA	± (1% +2)	500mA, 250V fast type fuse: 5x20mm
20mA	10μA		
200mA	100μA	± (1.2% +2)	
10A	10mA	± (2%+5)	10A/250V fast type ϕ5x20mm

At 10A Range: for continuous measurement ≤10 seconds and interval not less than 15 minutes

Resistance

Range	Resolution	Accuracy	Overload Protection
200 Ω	0.1 Ω	± (0.8%+5)	250V DC or AC
2000 Ω	1 Ω	± (0.8% +2)	
20K Ω	10 Ω		
200K Ω	100 Ω		
20M Ω	10K Ω	± (1%+5)	
200M Ω	100K Ω	± [5% (reading-10)+10]	

Diodes and Continuity Measurement

Range	Resolution	Remark	Overload Protection
→⊢	1mV	Display approximate forward voltage drop: 0.5v ~ 0.8v	250V DC or AC
•)))	1Ω	Buzzer beeps at < 70Ω	

Square Wave Output

Range	Illustration
⎍ OUT	Approx. output 50Hz square wave signal. As a simple signal source with 47KΩ resistance output.

- No overload protection
  Make sure voltage output of calibrated equipment level is less than 10V to avoid damages to the meter

Measurement Operation

DC Voltage Measurement

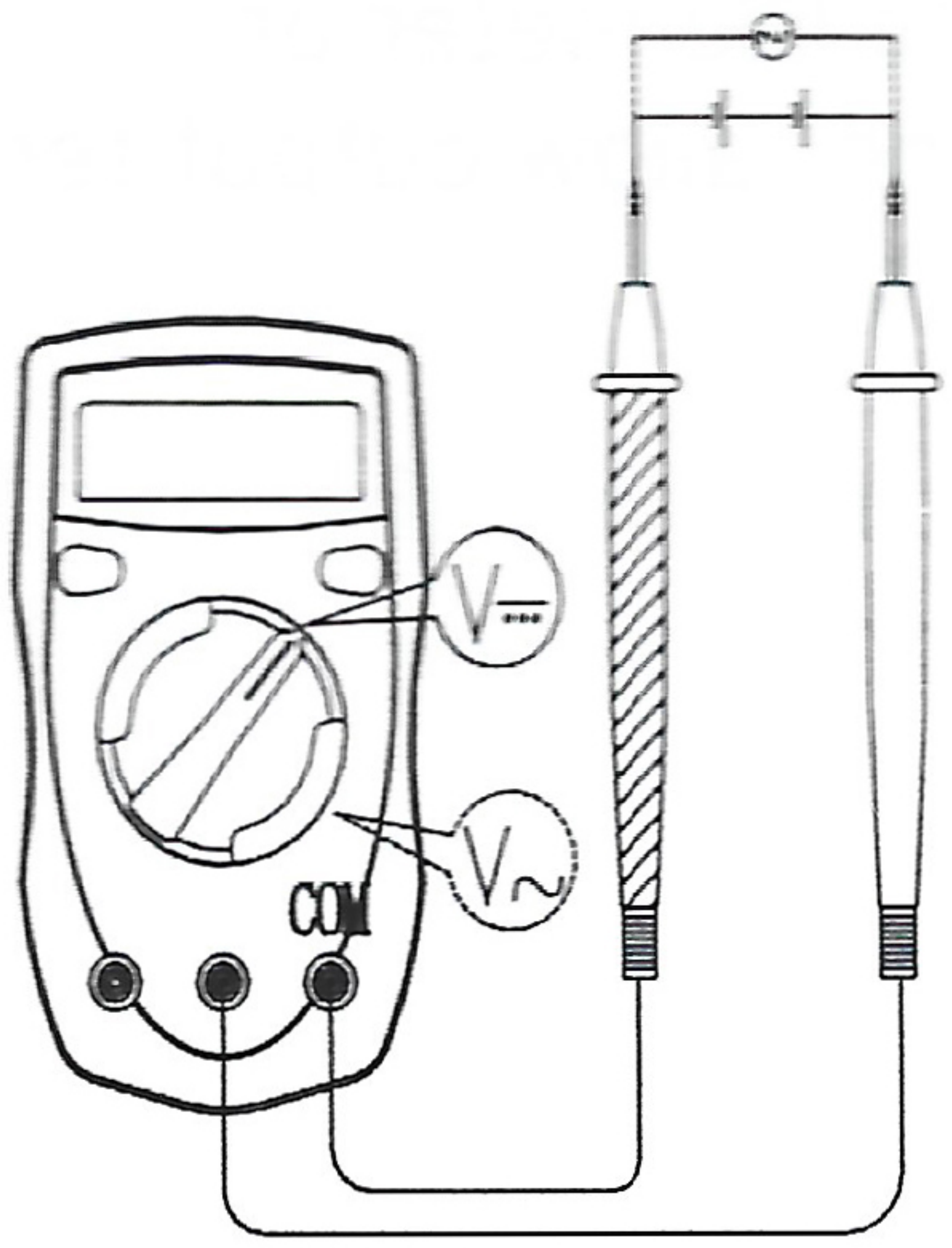


Figure 2

DC Voltage Ranges: 200mV, 2000mV, 20V, 200V, 500V
Input Impedance: 10MΩ

1. Plug the red test lead into the VΩmA terminal, then plug the black test lead into the COM terminal.
2. Set the rotary switch to the appropriate measurement in V ⎓ range.
3. Connect the test leads to the object of measurement. Hold them in place until the results on the display stabilize.
4. When measurement is completed, disconnect the test leads from the object of measurement.

NOTE

- If the value of voltage is unknown, use the maximum measurement position (500V) and reduce the range until proper readings are obtained.
- The LCD will display "OL" if there in an overload within the selected range. Select a higher range to obtain a correct reading.
- If the circuit impedance is less than or equal to 10kΩ, the error is negligible (0.1% or less).

AC Voltage Measurement

(See Figure 2)

AC Voltage Ranges: 200V, 500V
Input Impedance: 5MΩ

1. Plug the red test lead into the VΩmA terminal, then plug the black test lead into the COM terminal.
2. Set the rotary switch to the appropriate measurement in V~ range.
3. Connect the test leads to the object of measurement. Hold them in place until the results on the display stabilize. The displayed measured value is the value of sine wave (mean value response).
4. When measurement is completed, disconnect the test leads from the object of measurement.

NOTE

- If the value of voltage is unknown, use the maximum measurement position (500V) and reduce the range until proper readings are obtained.
- The LCD will display "OL" if there in an overload within the selected range. Select a higher range to obtain a correct reading.
- If the circuit impedance is less than or equal to 10kΩ, the error is negligible (0.1% or less).

DC Current Measurement

⚠ WARNING

Never attempt an in-circuit current measurement where the voltage between the terminals and ground is greater than 60V. If the fuse burns out during measurement, this may cause harm to the user and/or damage to the device. Use proper terminals, functions, and range for measurement.
When the testing leads are connected to the current terminals, do not parallel them across any circuit.

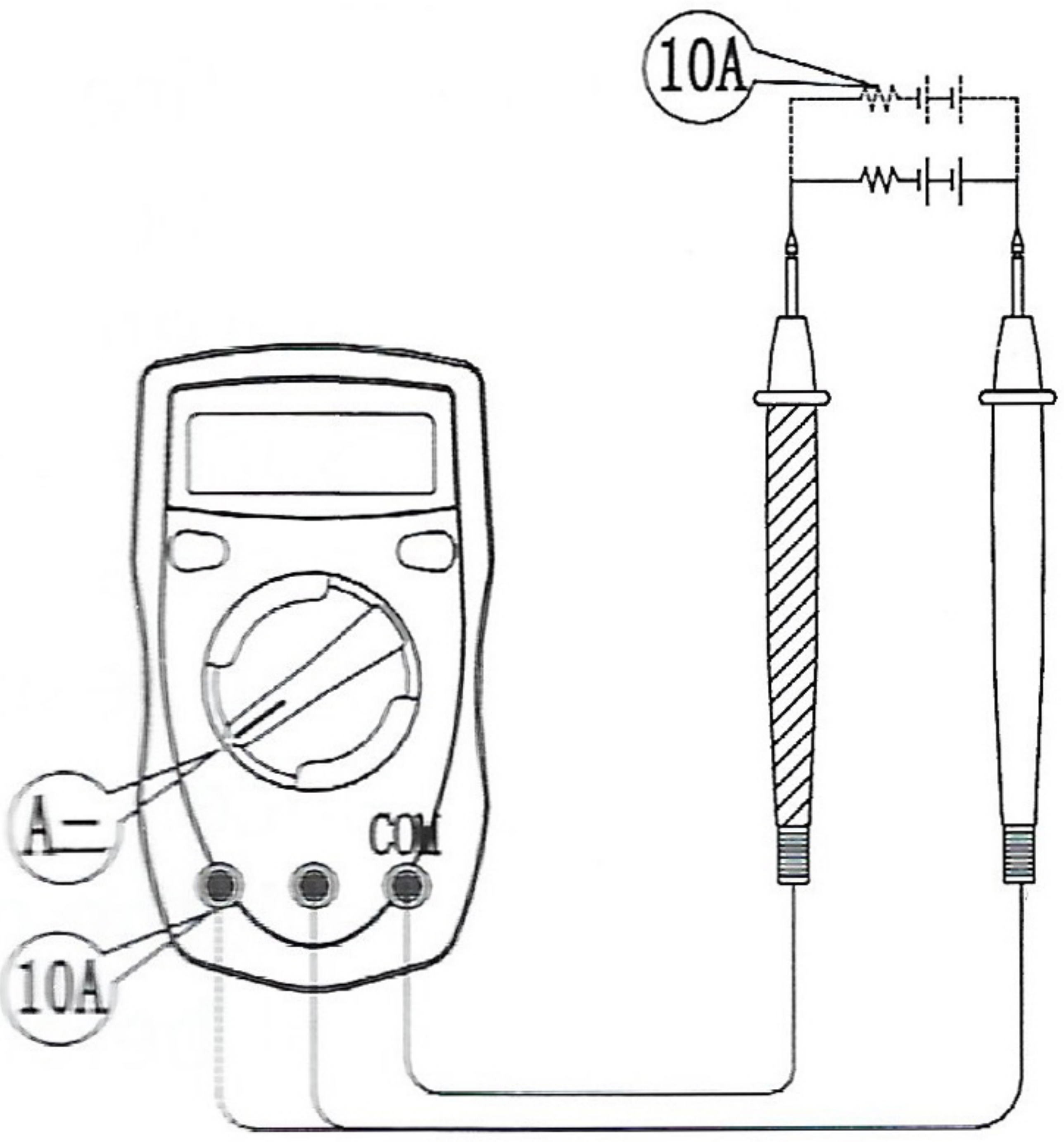


Figure 3

DC Current Ranges: 2000µA, 20mA, 200mA, 10A

1. Turn off the power to the circuit and discharge all highvoltage capacitors.
2. Plug the red test lead into the VΩmA or 10A terminal, then plug the black test lead into the COM terminal.
3. Set the rotary switch to the appropriate measurement in A ⎓ range.
4. Break the current path to be tested.
5. Connect the red test lead to the most positive side of the break and the black test lead to the most negative side of the break.
6. Turn on the circuit power.

7. When measurement is completed, disconnect the test leads from the object of measurement.

NOTE

If the value of voltage is unknown, use the maximum measurement position (10A) and reduce the range until proper readings are obtained.

Resistance Measurement

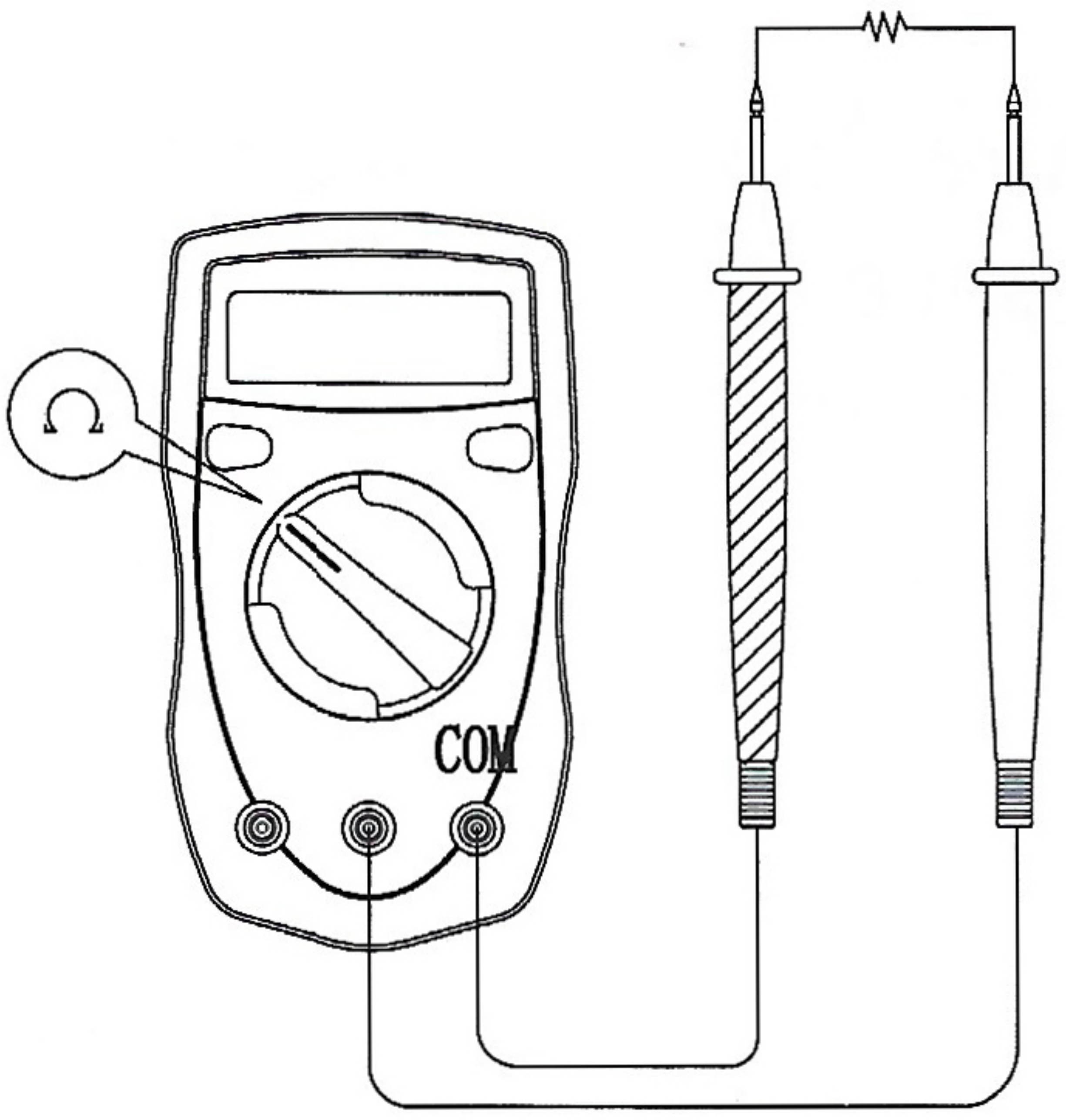


Figure 4

Resistance Ranges: 200Ω, 2000Ω, 20kΩ, 200kΩ, 20MΩ, 200MΩ

1. Plug the red test lead into the VΩmA terminal, then plug the black test lead into the COM terminal.
2. Set the rotary switch to the appropriate measurement in Ω range.
3. Connect the test leads to the object of measurement, the measured value will appear on the display.
4. When measurement is completed, disconnect the test leads from the object of measurement.

NOTE

- The test leads can add 0.1Ω to 0.3Ω of error to the resistance measurement. To obtain precise readings in lowresistance measurement (200Ω), short-circuit the input terminals beforehand and record the reading obtained (reading X). This is the additional resistance from the test lead. Then use the equation: Measured resistance value (*Y*) - (*X*) = resistance result

- For high-resistance measurements (>1MΩ), it may take a few seconds for the reading result to stabilize.

Diode Measurement

⚠ WARNING

To avoid damage to the meter and/or the object of measurement, disconnect the circuit power and discharge all the high-voltage capacitors before diodes.

Test to check diodes, transistors, and other semiconductor devices. The diode test sends a current through the semiconductor junction, then measures the voltage drop across the junction. A good silicon junction drops between 0.5V and 0.8V.

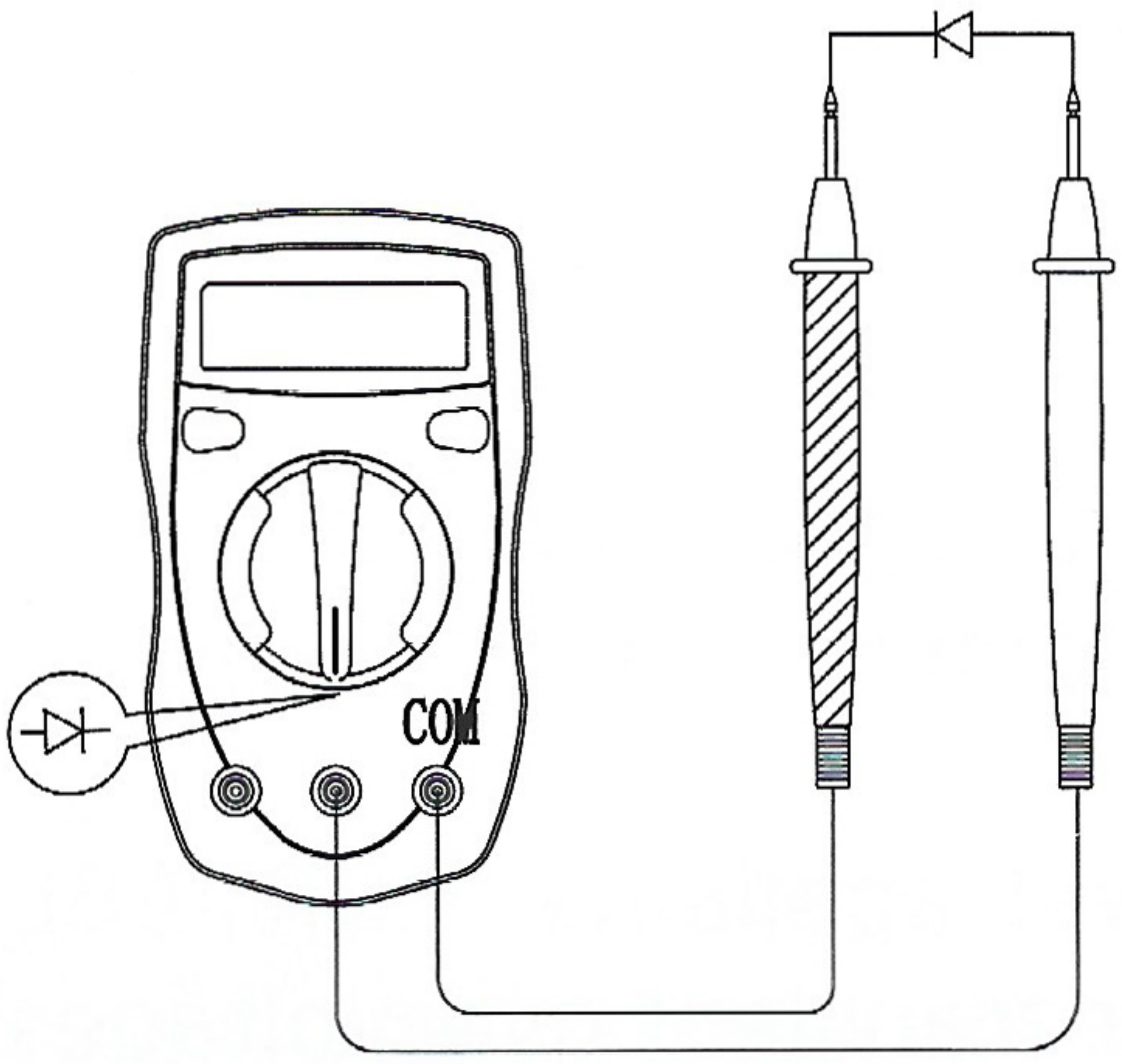


Figure 5

1. Plug the red test lead into the VΩmA terminal, then plug the black test lead into the COM terminal.
2. Set the rotary switch to the →+ setting.
3. For forward voltage drop readings on any semiconductor component, place the red test lead on the component's anode and place the black test lead on the component's cathode. Hold them in place until the results on the display stabilize.
4. When measurement is completed, disconnect the test leads from the object of measurement.

NOTE

- In a circuit, a good diode should still produce a forward voltage drop reading of 0.5V to 0.8V; however, the reverse voltage drop reading can vary depending on the resistance of other pathways between the probe tips.
- The LCD will display "OL" if the open-circuit is incorrectly connected.
- The unit of diode is volt (V), displaying the positiveconnection voltage-drop value.

Continuity Measurement

1. Plug the red test lead into the VΩmA terminal, then plug the black test lead into the COM terminal.
2. Set the rotary switch to the ·)) setting.
3. Connect the test leads across with the object of measurement.
4. The buzzer will sound if the resistance of the circuit is under 70Ω.

NOTE

The LCD will display "OL" if the circuit is open.

Square Wave Output

⚠ WARNING

To avoid damage to the meter and/or the object of measurement, do not allow output terminals (red test lead) to surpass 10V.

1. Plug the red test lead into the VΩmA terminal, then plug the black test lead into the COM terminal.
2. Set the rotary switch to the ⊔⊓ OUT setting.
3. Connect the test leads across with the object of measurement. Hold them in place until the results on the display stabilize.
4. When measurement is completed, disconnect the test leads from the object of measurement.

NOTE

- The frequency is approximately 50Hz.
- When loaded to 1MΩ, the output scope will be higher than 3Vpp.

Maintenance

⚠ WARNING

- To avoid false readings, possible electrical shock and/or personal injury, replace the battery as soon as the low battery indicator appears on the display.
- To avoid electrical shock, arc blast, personal injury, and/or damage to the meter, use the specified fused ONLY in accordance with the following procedure.

Battery and Fuse Replacement

1. Disconnect the test leads from the input terminals of the meter.
2. Turn OFF the meter
3. Using a screwdriver, unscrew the battery compartment located on the bottom of the meter. Slide off the battery compartment cover.
4. Remove the used batteries from the battery compartment.
5. Remove the fuse by gently prying one end loose, then take the fuse out from its bracket.
6. Replace the battery with a new 9V battery.
7. Install replacement fuses with the identical type and specification: 500mA, 250V fast type, ϕ 5x20mm and 10A, 250V fast type, ϕ 5 x 20mm (make sure the fuse is fixed firmly in the bracket).
8. Re-apply the compartment cover and reinstall the screw firmly.

Warranty Information

Etekcity warrants all products to be of the highest quality in material, craftsmanship, and service, effective from the date of purchase to the end of the warranty period.

Etekcity will replace any product found to be defective due to manufacturer flaws based on eligibility. Refunds are available within the first 30 days of purchase. Refunds are only available to the original purchaser of the product. This warranty extends only to personal use and does not extend to any product that has been used for commercial, rental, or any other use in which the product is not intended for. There are no warranties other than the warranties expressly set forth with each product.

This warranty is non-transferrable. Etekcity is not responsible in any way for any damages, losses, or inconveniences caused by equipment failure by user negligence, abuse, or use noncompliant with the user manual or any additional safety, use, or warnings included in the product packaging and manual.

This warranty does not apply to the following:

- Damage due to abuse, accident, alteration, misuse, tampering, or vandalism.
- Improper or inadequate maintenance.
- Damage in return transit.
- Unsupervised use by children under 18 years of age.

Etekcity and its subsidiaries assume no liability for damage caused by the use of the product other than for its intended use or as instructed in the user manual. Some states do not allow this exclusion or limitation of incidental or consequential losses so the foregoing disclaimer may not apply to you. This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

ALL EXPRESSED AND IMPLIED WARRANTIES, INCLUDING THE WARRANTY OF MERCHANTABILITY, ARE LIMITED TO THE PERIOD OF THE LIMITED WARRANTY.

Additional 1-Year Warranty

You can extend your 1-year warranty by an additional year. Log onto www.etekcity.com/warranty and enter your order number (for example, from Amazon or Houzz) to register your new product for the extended warranty.

If you are unable to provide the order number for your product, please type a short note in the order number field along with the date you received your product.

Defective Products & Returns

If your product proves defective within the specified warranty period, please contact Customer Support via support@etekcity.com with your order number. DO NOT dispose of your product before contacting us. Once Customer Support has approved your request, please return the unit with a copy of the invoice or your order number.

Customer Support

If you encounter any issues or have any questions regarding your new product, please contact our helpful Customer Support Team. Your satisfaction is our goal!

Etekcity Corporation
1202 N Miller St., Suite A
Anaheim, CA 92806

Support Hours
Mon - Fri,
9:00 am - 5:00 pm PST/PDT

Toll Free: (855) 686-3835
Email: support@etekcity.com

*Please have your order confirmation number ready before contacting Customer Support.